# NORTHERN CADDISFLY (TRICHOPTERA) FAUNA IN A REMNANT BOREAL WETLANDS OF WEST VIRGINIA[1]

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ABSTRACT: Eight species of typically northern Trichoptera are reported from shallow ponds and spring seeps within a red spruce (*Picea rubens* Sarg.) forest in West Virginia (WV). *Platycentropus radiatus* and *Banksiola dossuaria* were dominant species, found here in the highest abundance ever recorded. *Ptilostomis ocellifera* were present in numbers typical of the species. *Limnephilus moestus* adults were rarely collected. *Oligostomis pardalis* and *Nemotaulius hostilis* were rare species in ponds, the former being a new record for WV. *Phylocentropus lucidus*, previously reported from a single specimen in WV, and *Frenesia difficillis* were plentiful in headwater spring seeps.

Areas of the Alleghany highlands of West Virginia having remnant boreal vegetation currently represent the known southern distribution limits of many plants (Strausburg & Core, 1977). Surprisingly little is known about the aquatic insect fauna of these areas, particularly shallow ponds and spring seeps associated with bogs. Permanent and temporary ponds ranging from 5 to 1000m$^2$ surface area were created by beavers and log skidders 7 years ago near the Sinks of Gandy, Randolph County, West Virginia (elev. 1090m, lat. 38°43′, long. 79°38′W). Permanent ponds were subject to seasonal water level increases of 15-25cm during the wet season (October-June). Temporary ponds were dry in the summer, and wet for 6-10 months depending on basin depth and annual rainfall. Vegetation in seasonal wetlands was dominated by sedge (*Carex* spp.), rush (*Juncus* spp.), and rice cutgrass (*Leersia oryzoides*). Permanent ponds harbored the emergent macrophyte *Sparganium americanum*.

A two-year series of light trappings and larval collections throughout the area revealed an association of eight species of typically northern Trichoptera. One species is reported here for the first time in WV and two species reported earlier from single specimens are now known to occur in specific locations. The purpose of this paper is to describe the unique association of Trichoptera in these ponds, and report the new record for WV.

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## Limnephilidae

***Platycentropus radiatus*** (Say) was the dominant caddisfly in shallow ponds throughout the area. Densities of second instar larvae were as high as $386 \pm 101/m^2$ (95% CI) in the submerged vegetation of permanent and temporary ponds, with as many as $50 \pm 23/m^2$ reaching the pupal stage. Eggs were laid in September, hatched in late October, and most larvae reached fifth instar by May. Lab reared specimens required approximately 2 weeks for pupation. Emergence in nature occurred in June and early July. Adults diapaused during the dry summer months, as reported for the other members of the family (Wiggins, 1973). Eggs apparently hatched following inundation during the wet season. Larvae inhabited temporary ponds as small as 5 $m^2$ surface area and 10-20cm depth. Larval growth was rapid in a pond having a 6 month wet season, and emergence from this pond corresponded with emergence from permanent and temporary ponds that had longer wet seasons. Life cycle features were closely parallel to those reported for *Limnephilus indivisus* in Ontario (Richardson & McKay, 1984). Rainfall levels 8-10cm below normal during the second year of this study resulted in 6 temporary ponds filling to <10cm depth, and *P. radiatus* larvae were absent.

***Nemotaulius hostilis*** (Hagen) is undoubtedly at the southernmost extent of its range in this area of WV (Hill & Tarter, 1978), and occurs in limited populations within specific habitats. This species is found only in permanent ponds having seasonally fluctuating water levels (Richardson & McKay, 1984). Life history in this area was similar to that reported for Alberta (Berte & Pritchard, 1986). Second instar larvae first appeared in August, and larvae reached fifth instar by October. A fifth instar larva collected on October 30 pupated after 2 weeks at room temperature, and emerged November 28. No adults were collected in the field. As with populations in Alberta, this species appears to be closely associated with the emergent macrophyte genus *Sparganium*.

***Limnephilus moestus*** (Banks) has been collected occasionally throughout the Alleghany highlands (Hill & Tarter, 1978). Three adults (two male and one female) and no larvae were collected at this site.

***Frenesia difficilis*** (Walker) adults were extremely abundant in this location during their November emergence. Larvae were confined to headwater spring seeps and were not found in ponds. Life history was similar to that reported for Massachusetts (Flint, 1956), with oviposition occurring in early winter. It appears to be near the southern range limit at this

location since none were reported from November collections by Tarter & Hill (1979) at Cranberry Glades, the southernmost extensive upland wetlands in WV located 85 km to the southwest. Tarter & Hill (1980) reported it from Randolph and Monongalia County, WV.

## Phryganeidae

***Banksiola dossuaria*** (Say) was the most abundant species of phryganeid found, with densities of second instar larvae as high as $512 \pm 352/m^2$ near oviposition sites. Adults were most abundant in early May, larvae hatched from eggs in July in a permanent pond, and larvae overwintered mostly as fifth instars. Larvae were most abundant in permanent ponds, and temporary ponds with a wet season lasting more than 9 months.,

***Ptilostomis ocellifera*** (Walker) was present in low densities in permanent and temporary ponds having mid-winter water levels >15cm. Densities were highest in temporary pools ($8.8 \pm 4.6/m^2$)and adults emerged in April. Empty third instar cases were found at densities of $1.2 \pm 0.6/m^2$ in a shallow pond (<10cm deep) where larvae apparently succumbed to low temperatures.

***Oligostomis pardalis*** (Walker) was rare in this area, and a new record for West Virginia. No larvae were collected. A single adult male was collected from the surface of a temporary pond in early June.

## Polycentropodidae

**Phylocentropus lucidus** (Hagen) was relatively abundant in light traps in May. The only other record of this species in West Virginia was a single specimen collected by Tarter & Hill (1979) in Cranberry Glades. Larvae are tube dwellers in sandy substrates of low gradient headwater spring seeps.

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